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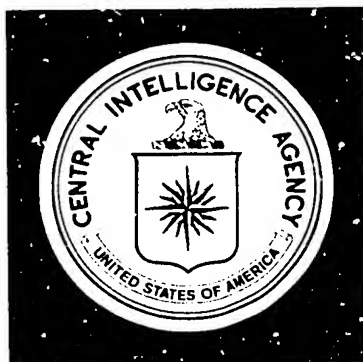
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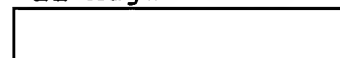
Weekly Surveyor

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TSWS-32/75
11 August 1975

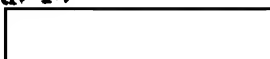


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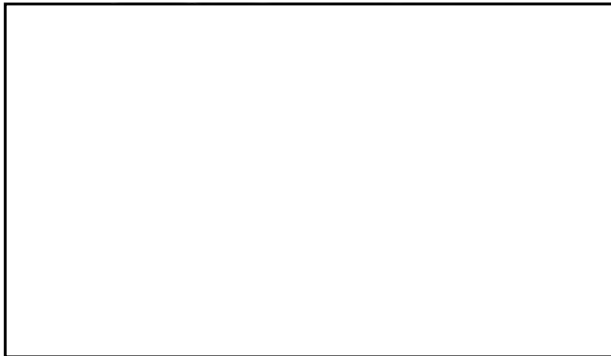


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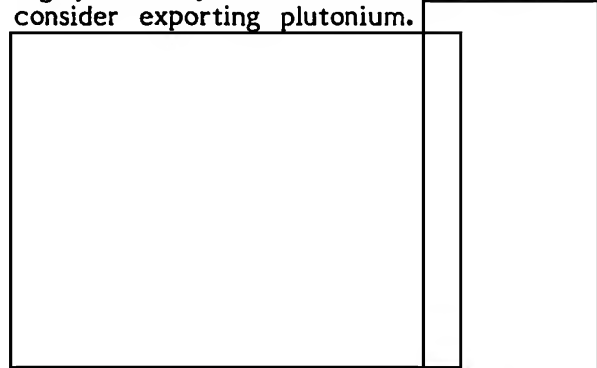
WEEKLY SURVEYOR

USSR AND EASTERN EUROPE

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highly unlikely that the Soviets would consider exporting plutonium.

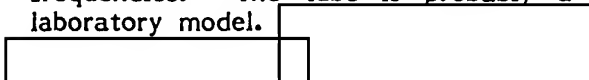


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A Soviet-built tube, a linear-beam gyrotron oscillator, was claimed to produce 12 kW in a CW mode of operation at 107 GHz. This represents the highest continuous power level generated by these frequencies. The tube is probably a laboratory model.



Four Soviet civil aviation experts visited a US simulator training facility for commercial airline pilots. The questions they asked indicated a general lack of knowledge of simulation flight training technology and procedures. The Soviets have a serious interest in obtaining Western flight simulation technology to improve their civil aviation flight safety programs.

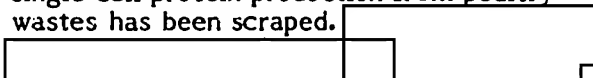


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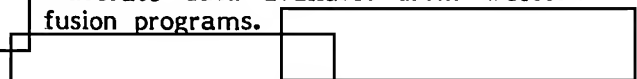
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Current research in East Germany indicates a broad-based approach to air pollution from local mines and industry. Research on the effects of heavy metals on livestock has shown a definite need for the presence and absence of particular heavy metals. East German work on single cell protein production from poultry wastes has been scrapped.



The Soviets are far behind the US in the technology of operating and diagnosing fusion machines. The Soviets are able, however, to overcome much of this disadvantage by extensively analyzing the elaborate data available from Western fusion programs.



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It is likely that the Soviets are justifying the development of fusion power in terms of the fossil fuels it would release for export. The Soviets are justifying fission/fusion hybrid reactors in terms of the large amount of plutonium they produce. In the present political climate it seems

Soviet Ambassador A. A. Roschin reiterated on 23 June that BW weapons are non-existent in the USSR, which is consistent with past official denials. It is known that the Soviet Union has the technical capability to produce BW weapons, and there is

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evidence that they probably have facilities to do so. The existence of such facilities, if not actually engaged in production, would not violate the BW convention of March 1975.

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Asian countries and, because of its high yield, it may become one of the more important varieties for these rice growing regions.

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WESTERN EUROPE

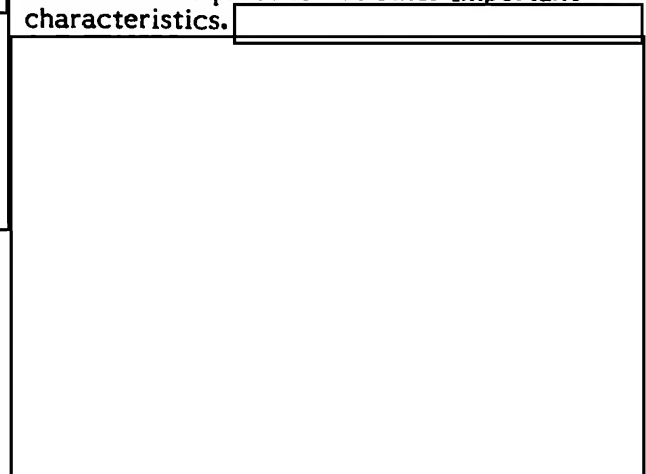
Saudi Arabia and France have concluded an agreement for cooperation which includes assistance for the peaceful uses of nuclear energy. French assistance probably will be limited to preliminary feasibility studies at this time.

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A radiation-induced wheat mutant, Rageni 15 developed by Pakistan, may represent a significant genetic achievement. Initial tests indicate that the wheat has about a 50 percent increase in protein content and produces high yields of flour. Further tests and field trials will be required to check for the presence of other important characteristics.

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SOUTHEAST ASIA

A new variety of rice, LD-12, being introduced into Sri Lanka is disease resistant and high yielding (double the current average rice yield). The variety may be adaptable to other Southeast

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NUCLEAR ENERGY

Soviets Trail US in Diagnostic Equipment for Fusion Experiments: During their visit to the US in June, Soviet delegates to the Joint Fusion Power Coordinating Committee were strongly impressed by the automated data acquisition assemblies observed in US laboratories. The Soviets revealed that designers at the Yefremov Institute consider diagnosticians as their enemies. As a result, the T-10 Tokamak has very few diagnostic access ports. It appears, however, that the Soviets have become very adept at analyzing the readily available and very detailed Western test results. [REDACTED]

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Comment: The Soviets are far behind the US in the technology of operating and diagnosing fusion machines. Whereas US diagnostic equipment allows the rapid printout of experimental measurements, the Soviet equipment restricts the availability of these data to a long period after acquisition--the data are recorded on film which must be developed.

The Soviets will not be able to utilize effectively their fusion machines until they incorporate diagnostic equipment using high-speed computers or, at least, polaroid-type film. They are able to overcome much of this disadvantage by extensively analyzing the elaborate data available from Western fusion programs. This allows them to understand their own rudimentary diagnostics and, ultimately, the workings of their experimental machines. Thus, it would appear that two of the main advantages of the fusion exchange program to the Soviets are the increased flow of the latest US diagnostic results and access to US diagnostic equipment. They have stated that they plan to use US experience in order to make the large leap from their T-10 Tokamak to their T-20 and hybrid Tokamaks. [REDACTED]

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Soviets Justify Fission/Fusion Hybrid Reactors by Their Potential for Plutonium Production: The Soviet delegation to the Joint US-USSR Fusion Power Coordinating Committee meeting held in the US in June was committed completely to the idea of a fission/fusion hybrid Tokamak reactor.

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It was clear that the Soviets are having considerable difficulty in justifying the costs of their fusion program due to the large Soviet reserves of coal, gas, and uranium. However

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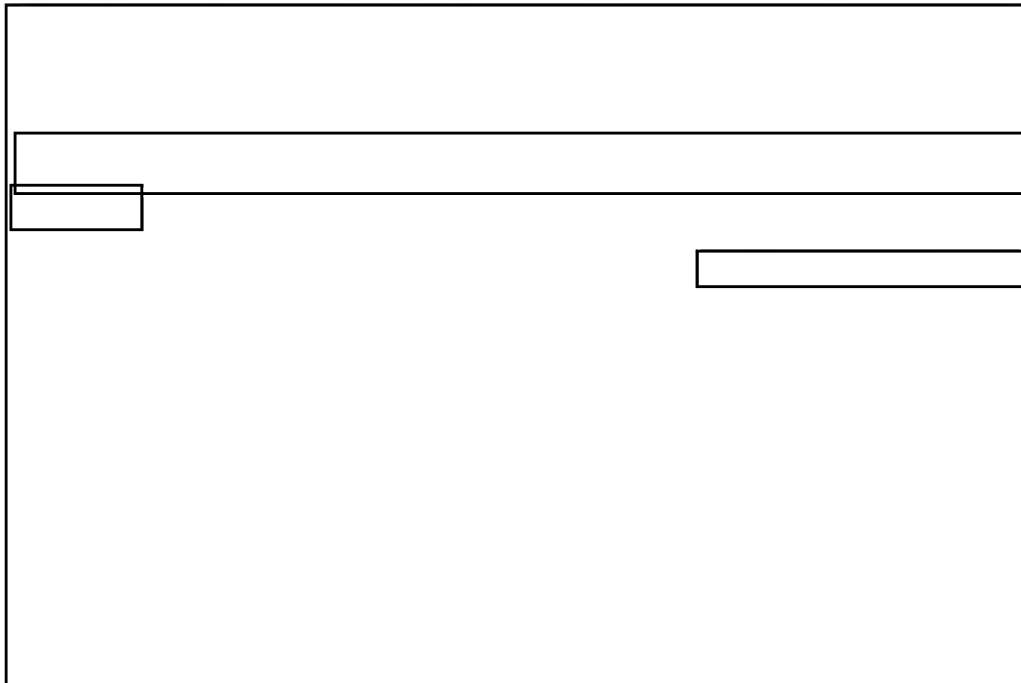
Soviet planners were beginning to realize that the development of fusion power would permit the export of domestic fuels, including plutonium, for hard currency. The Soviets seemed perfectly willing to plunge into a hybrid program in order to be able to export large amounts of plutonium.

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Comment:

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In the present political climate it seems highly unlikely that the Soviets would consider exporting plutonium. It is likely, however, that the Soviets are justifying the development of fusion power in terms of the fossil fuels it would release for export in order to alleviate previously reported budgetary pressures on their CTR program.



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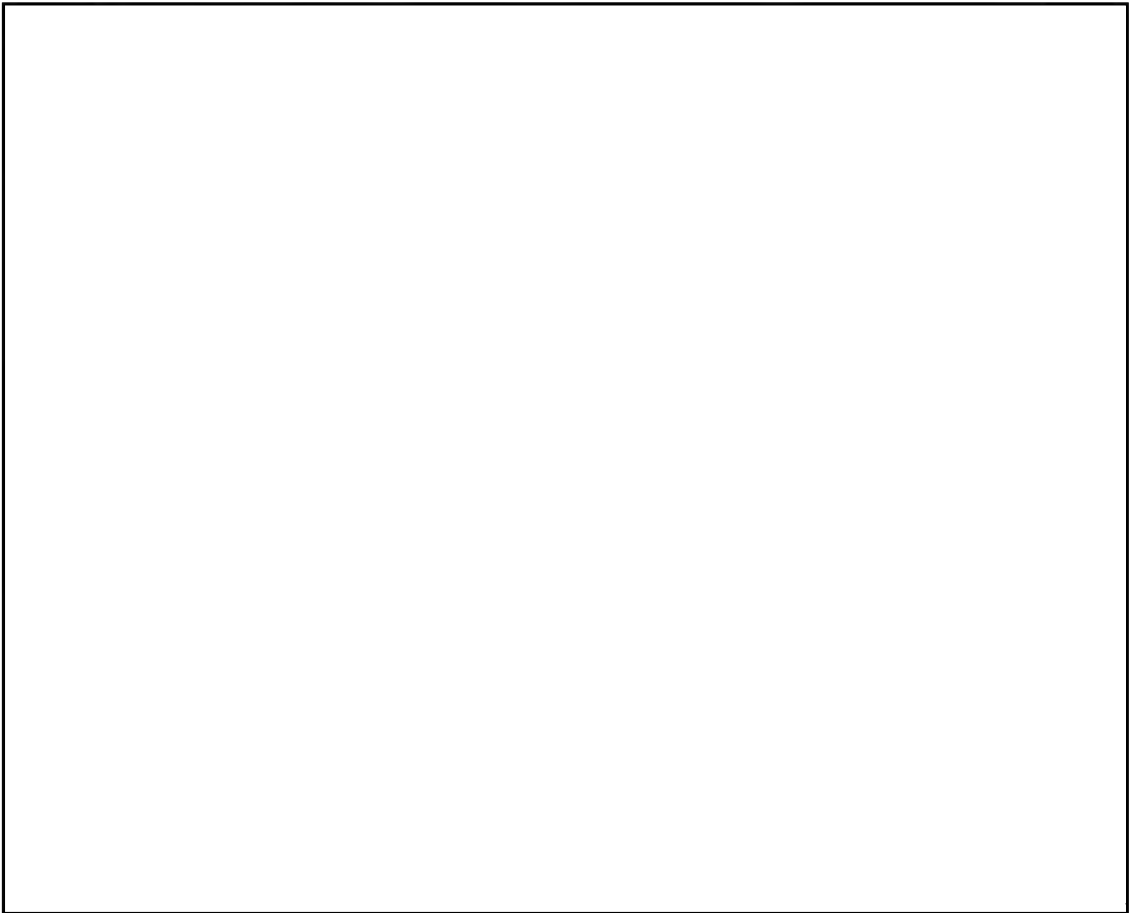
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Saudi Arabia and France Will Cooperate in Nuclear Energy:
During his visit to France, Prince Fahd, crown prince and deputy premier of Saudi Arabia, and French Prime Minister Jacques Chirac concluded a cooperation agreement on 24 July. The agreement regulates the bases of cooperation between the state establishments and specialized organizations of both countries in the fields of economic development and of energy in all its forms, including nuclear energy for peaceful purposes.



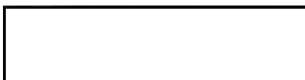
Comment: The agreement provides the basis for subsequent agreements on specific areas of cooperation. While Saudi Arabia is interested in eventually acquiring dual-purpose, power and water desalination nuclear reactors, French assistance in the near future probably will be limited to training in nuclear sciences and possibly some preliminary feasibility studies for the use of nuclear power in Saudi Arabia.



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BIOLOGICAL/CHEMICAL WARFARE

Soviets Officially Deny BW Stockpile: At the 23 June Co-Chairman's meeting of the Conference of the Committee on Disarmament (CCD), Soviet Ambassador A.A. Roshchin maintained the official Soviet position of the nonexistence of Soviet BW weapons. When asked about Soviet compliance with the provisions of the BW convention which calls for the destruction of stockpiles, Roshchin stated that the Soviets would report how BW destruction was going, but he also said that the USSR had no weapon at its disposal.

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[REDACTED]

Comment: The BW Convention banning R&D, production, and stockpiling of BW agents was signed in 1972 and officially went into force in March 1975. In lieu of a provision for verification, the USSR accepted the proposal that some type of notification of stockpile destruction was appropriate for those nations complying with the convention.

Roshchin's statement is consistent with past official Soviet denials of the possession of BW weapons. But the Soviet Union has the technical capability to produce BW weapons if and when they would decide to do so. There is evidence that they probably have facilities to produce such weapons.

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[REDACTED]

The existence of BW-related installations is not in violation of the BW convention; only the actual production and stockpiling is forbidden.

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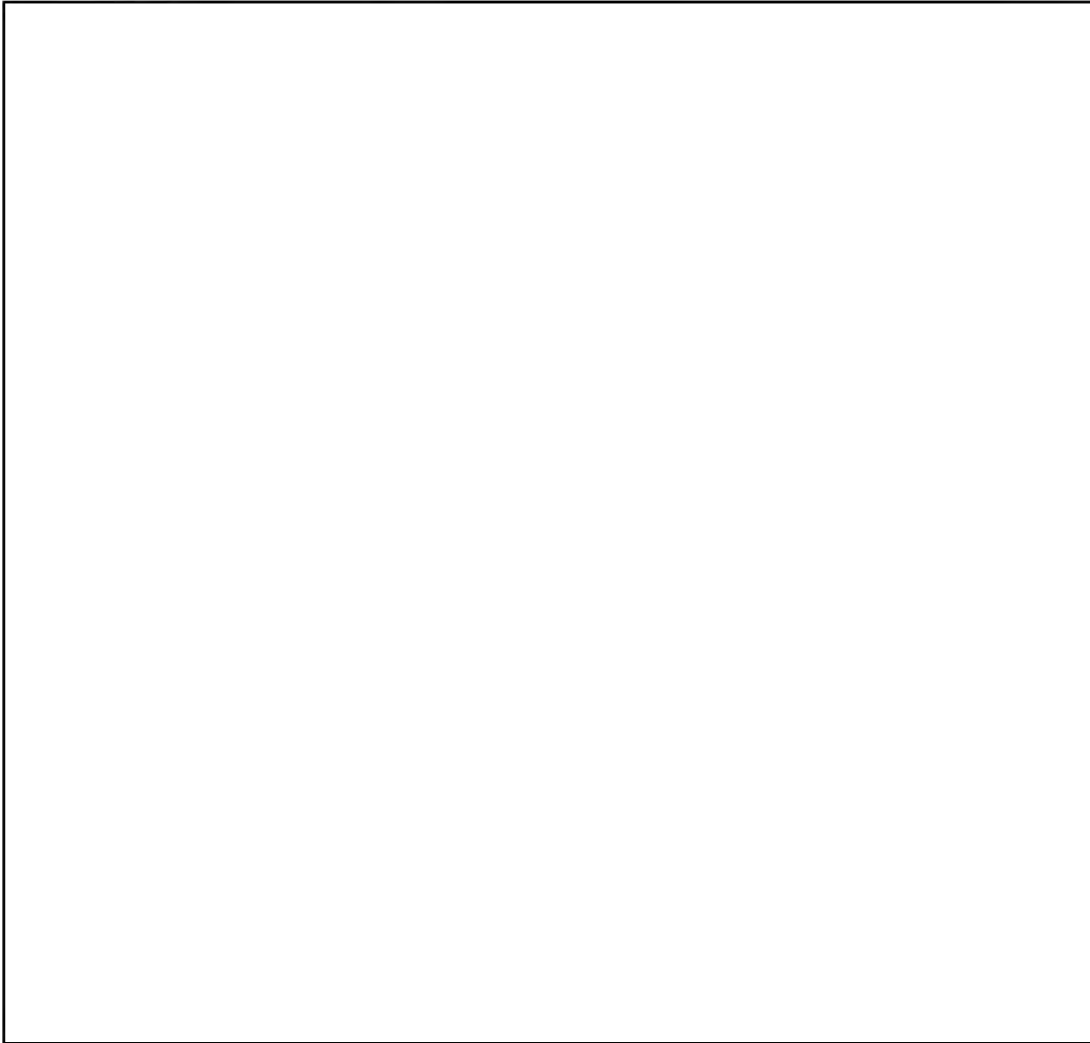
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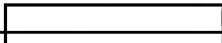
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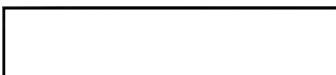
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Soviets Claim High Power Millimeter Wave Tube: A Soviet built tube, a linear-beam gyrotron oscillator, was claimed to produce 12 kW at 107 GHz. It was described as a cylindrical waveguide within which the electrons are stimulated into cyclotron resonance oscillations. 



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Comment: The high power output claimed by the Soviets at these high frequencies is indicative of con-



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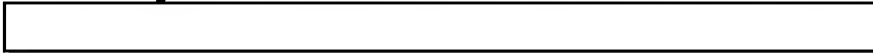
tinued Soviet interest in cyclotron resonance oscillators and amplifiers. The Soviet tube achieved the stated 12-kW of power in a CW mode of operation. This figure represents the highest continuous power levels yet generated at these frequencies. The nearest comparable US tubes are a family of traveling-wave tubes which attain 5 kW at 55 GHz and 1 kW at 93 GHz. Pulsed operation of experimental US tubes has achieved output of 100 kW at these same wavelengths.



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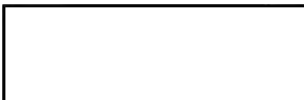
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The Soviet tube, however, is probably still a laboratory model with further development needed before becoming a production item.



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AGROTECHNOLOGY AND FOOD RESOURCES

New Rice Variety Could Provide Higher Yields for South-east Asian Countries: A new high yield, disease resistant variety of rice, "LD-12," is being introduced in Sri Lanka as a possible solution to the island's food problems. According to the state agricultural research office, LD-12 has been yielding about 100 bushels an acre--twice the current average of the four highest yielding varieties known in this region. Sri Lanka researchers believe that LD-12 also will adapt to the climatic conditions of other Southeast Asian countries without difficulty and help meet the food needs of the growing populations of this part of the world.

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Comment: If the protein content of this new variety has not been adversely affected by crossbreeding for yield, LD-12 may take its place alongside "IR8" as one of the more important varieties of rice for Southeast Asia. One of the main challenges to breeders of crop plants is that efforts to improve yield tend to reduce protein content and vice versa.

IR8, the first "miracle rice" developed by the International Rice Research Institute in the Philippines, contains 8 percent protein. The institute is now working on the development of a variety that yields as well as IR8 but has at least 25 percent more protein. Such a discovery would greatly benefit a third of the world's population who depend upon rice for more than half of its food.

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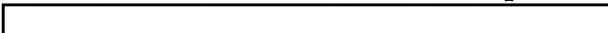
Pakistani Wheat Mutant May Be a Significant Genetic Development: A Pakistani scientist, Dr. Hassan Khan, of the Radiation Genetics Institute, Lyallpur, Pakistan, appears to have made a significant breakthrough in the development of a wheat mutant. Tests conducted in the US on Dr. Kahn's mutant, "Rageni 15," the result of a radiation experiment, indicated that the wheat had about a 50 percent increase in both protein and nitrate reductase activity. The latter is extremely important from the

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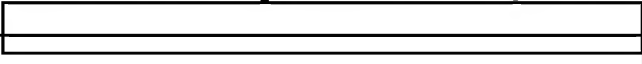
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standpoint of more efficient use of available nitrogen by a plant. In addition, Rageni 15 produced a higher yield of flour than has ever been seen before from an equivalent sample of wheat. 

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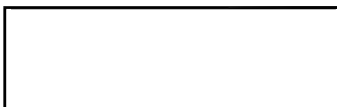
Comment: It seems premature to discuss this mutant in terms of a breakthrough. At the very least, however, the germ plasm of Rageni 15 should prove valuable to plant breeders in the constant search for improved varieties of wheat. The laboratory tests conducted on Rageni 15 so far confirm only its high protein content and nitrate reductase activity. Further tests are needed to determine the quality of the protein and baking characteristics. In addition, much field testing is necessary to check such important characteristics as resistance to diseases, insects, and harsh climates.

Radiation-induced mutations have been known since 1927, but only in recent years has the state of knowledge improved to the point where it is possible to obtain generally good results. To date more than 100 varieties of induced mutant crop plants, including wheat, rice, barley, oats, and soybeans, are being grown by farmers on millions of acres throughout the world. Some of these varieties have played a part in the "green revolution" that has resulted in substantial improvements in quality and yield of crops. 

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BEHAVIORAL SCIENCES

Soviet Civil Aviation Lacks Simulation Training Expertise: Four Soviet civil aviation experts visited a US simulator training facility for commercial airline pilots. The Soviet visitors were: Alexander Nazarov, Chief, Administration of Education and Training Establishments, Ministry of Civil Aviation; Alexander Okhonskiy, Deputy Chairman, State Aviation Control Commission; Ivan Vasin, Director Civil Aviation Academy, Leningrad; Although Department of International Affairs, Ministry of Civil Aviation. They observed simulators for both standard and wide bodied aircraft. Nazarov asked questions regarding US arrangements for training on the A-300 airbus and how many people it would take to set-up such an operation. Although the Soviets stated that a simulator training program had been established for YAK-40 aircrews, it was felt that their questions indicated a general lack of knowledge of simulation procedures, training techniques and management procedures, even though all except Lyubimov were rated pilots.

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Comment: Soviet flight simulation capabilities in both military and civil aviation sectors continue to lag US capabilities by approximately 8 to 10 years. Past reporting on the YAK-40, TU-134, and IL-18 flight simulators indicated that these simulators were less advanced than US trainers and provided extremely poor landing cues. The YAK-40 trainer was thought to provide hazardous training because of its lack of fidelity with the actual flight environment.

Czechoslovakia has produced some of the better Soviet military flight trainers, and the Soviets have been attempting to gain Western expertise in flight simulation. Soviet civil aviation training and flight safety programs will continue to suffer until they are able to make significant improvements in their simulation training facilities and procedures.

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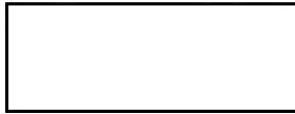
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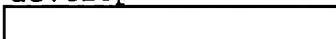
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LIFE SCIENCES

East Germans Study Animal Waste Conversion and Pollution Effects on Livestock: Research on the effects of heavy metal pollution and food supplements on livestock is under way at the Institute of Animal Nutrition and Veterinary Medicine, Jena. A disease has been discovered in cattle which possibly is related to silver toxicity. Conversely, a study has shown that a totally nickel-free diet caused death in goats and pigs after 2 years. The institute also has a program, as yet unsuccessful, to develop animal feed supplements from poultry wastes.

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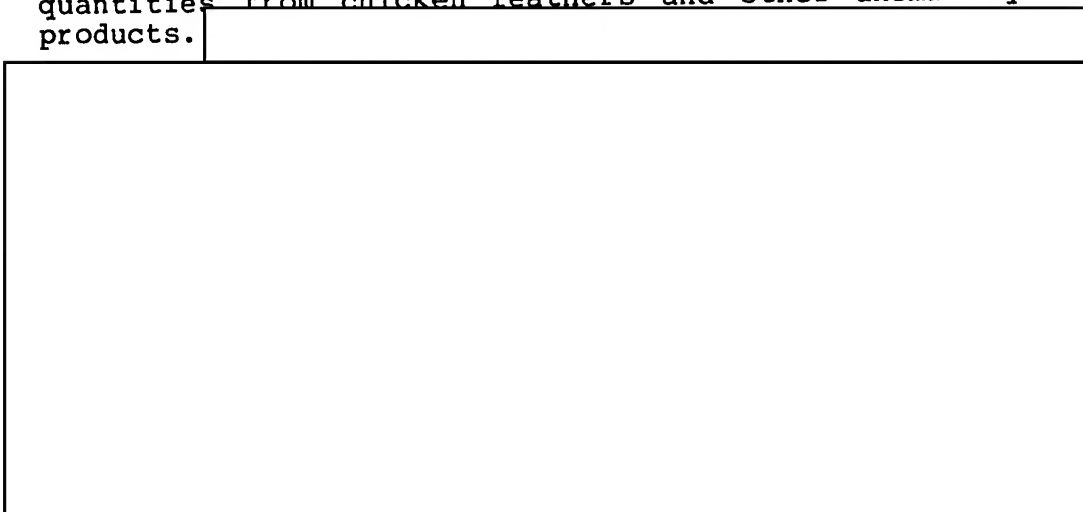


Comment: The current research at the Institute appears to be a broad-based sophisticated program oriented towards one of East Germany's major problems, i.e., air pollution from mines and industrial plants. For example, pastures in the mountainous areas in East Germany and Czechoslovakia are highly contaminated with silver from local mines.

The East German work has shown that protein derived from poultry wastes such as chicken feathers causes birth defects in test animals. This could have a major effect on other countries, most notably Sweden, as the National Swedish Environment Board reportedly is subsidizing construction of a plant to produce protein in thousand ton quantities from chicken feathers and other animal by-products.

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